"In concluding their Report the Council express their regret that it has not been possible, during the past year, to continue their former policy of adding to the permanent structures in the gardens. There are still several buildings much wanted for the better housing of certain parts of the collection, amongst which may be specified the anthropoid apes and the struthious birds, for which groups special accommodation is required. But in both these cases, to carry out the plans efficiently, a considerable expenditure would be necessary, and the margin of receipts over expenses is at present too slender to render it prudent to undertake the work. The Council look forward to the time when the small remaining balance of the mortgage-debt upon the Society's freehold house will be paid off, and when there will be at any rate a better prospect of devoting the surplus income to such purposes."

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE following is the list of scholarships and prizes just awarded at the Royal College of Science, London, with which is incorporated the Royal School of Mines:—First year's scholarships, Robert W. Forsyth, George W. Walker, John Thomas, Harry R. Prescott; second year's scholarships, Bernard E. Spencer, George S. West; "Edward Forbes" medal and prize of books for biology, Henry Lacey; "Murchison" medal and prize of books for geology, Joseph B. Morgan; "Tyndall" prize of books, for physics (Course I.), George D. Dunkerley; "De la Beche" medal for mining, Samuel W. Price; "Bessemer" medal and prize of books for metallurgy, Allan Gibb; "Frank Hatton" prize of books for chemistry, Robert E. Barnett. Prizes of books given by the Department of Science and Art: Mechanics, William H. Pretty; astrononmical physics, William E. Tubbs, Willie Whalley; practical chemistry, Robert E. Barnett, Gerald G. Quinn; mining, Samuel W. Price; principles of agriculture, Robert S. Seton.

DR. BUTLER, Master of Trinity College, Dr. Hill, Master of Downing College, Dr. Peile, Master of Christ's College, Dr. Sidgwick, Knightbridge Professor, Dr. Jebb, Regius Professor of Greek, Dr. J. Ward, Dr. Keynes, Mr. F. E. Kitchener, Mr. R. T. Wright, and Mr. A. Berry will represent Cambridge University at a conference on the relations between the work of the Universities and the work of secondary education in England, to be held at Oxford on October 10 and 11, 1893.

MR. HENDRICK, of the Royal Agricultural College, Cirencester, has been appointed lecturer and demonstrator in agricultural chemistry by the Glasgow and West of Scotland Technical College.

PROF. W. GARNETT, M.A., D.C.L., Principal of the Durham College of Science, Newcastle-on-Tyne, has been appointed director and technical adviser to the Technical Education Board of the London County Council.

SCIENTIFIC SERIALS.

THE most important papers in the *Botanical Gazette* for April and May are an account of a newly-discovered fungus, *Phyllogaster saccatus*, by Mr. R. Thaxter, proposed as the type of a new family, *Phyllogastreæ*, characterised by the absence of any volva or receptacle differentiated as such in the mature condition; on the tendrils of *Passiflora cœrulea*, by Mr. D. T. McDougal, in which the author states that the tendrils of the passion-flower are sensitive to contact with one another, contrary to Darwin's experience with *Bryonia* and *Echinocystis;* on the limitation of the term "spore," by Prof. C. McMillan, which does not seem to throw much light on the confusion at present prevailing; the commencement of a paper, by Mr. G. F. Atkinson, on the biology of the organism which causes the root-tubercles in the *Leguminosæ;* and on the genus *Corallorhiza*, by Mr. M. B. Thomas, who finds in the cells of the cortical tissue hyphal threads which he regards as the agent by means of which the plant is able to derive nutriment saprophytically from the decaying vegetable matter around it.

IN the *Journal of Botany*, for May and June, in addition to the serial papers to which allusion has already been made, Mr. W. Phillips describes the rare fungus, *Gyromitra gigas;* Messrs. E. F. and W. R. Linton, in a paper on British hawkweeds, add four more to the already too numerous British species or subspecies of *Hieracium*, viz. *H. graniticolum*, *clovense*, *Boswelli*, and *stenophyes;* in an article on some marine algæ from New Zealand, Mr. R. J. Harvey Gibson describes and figures a new seaweed, *Rhodocorton Parkeri.*

Meteorologische Zeitschrift, June.—On the climatic effect of forests upon their neighbourhood, by E. Ebermayer. The discussion is based upon observations made in Austria since 1866, and the results arrived at are that forests do exert an influence on temperature and humidity, but not to the same extent as mountains and large lakes. Within the forest the daytime is naturally cooler and the nights warmer, while some of the effects are beneficial and others injurious to vegetation. The connection between forests and rainfall is not proved; in any case the effect on local distribution of rainfall is quite subordinate.—Earth temperatures at Hamburg, in the years 1886-91, by W. J. van Bebber. Monthly and extreme values are given at depths of half a metre, and for each metre up to five, together with the temperature of the air and of the surface of the Elbe. The average extreme annual variation, at a depth of 0·5 m. amounts to 30°·6 F., but at a depth of 5m. the variation falls to 8°·1. At the former depth extreme temperatures of 66° and 30° occasionally occur, while at the latter depth temperatures exceeding 52°, or less than 39°, are very seldom recorded.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 15.—"On *Megaladapis madagascariensis*, an extinct gigantic Lemuroid from Madagascar." By C. J. Forsyth Major, M.D., For. Corr. Zool. Soc. (Communicated by Dr. Henry Woodward, F.R.S., V.P.G.S., &c.).

It is now forty-two years since Isidore Geoffrey Ste.-Hilaire announced to the French Academy of Science the discovery of gigantic eggs and a few bones of *Æpyornis* from superficial deposits in the island of Madagascar, anticipating that a rich fauna of extinct vertebrata would be speedily forthcoming.

Little has, however, been added to our knowledge since 1851 until the present time. In addition to the remains of a Crocodile, two Chelonians, and a *Hippopotamus*, first discovered by Grandidier, the number of distinct forms of *Æpyornis* is now rapidly increasing, and promises to rival in variety the New Zealand species of *Dinornis*, whilst the disclosure of a rich mammalian fauna seems only waiting to reward the carrying out of systematic exploration.

Four collections of sub-fossil vertebrates, from various regions of Madagascar, have recently been acquired by the British Museum of Natural History. Amongst one of these, sent over by Mr. J. T. Last (collector for Mr. Grose-Smith), is a somewhat imperfect skull of strange appearance obtained with numerous fragmentary Chelonian, Crocodilian, Hippopotamus, and Æpyornis-remains from a marsh at Ambolisatra on the south-west coast of Madagascar. For this remarkable fossil Dr. Major proposes the name of *Megaladapis madagascariensis*, and the establishment of a distinct family of the sub-order *Lemuroidea*, of which *Megaladapis* appears to be a much-specialised gigantic member, being approximately three times the size of the cranium of the largest existing Lemurid.

The salient features of the skull are the enormous lateral development of the anterior inter-orbital portion of the frontals, extending over the small, thick-walled tubular orbits. The post-orbital frontal region is comparatively narrow and elongate, and separated by a slight contraction from the equally narrow parietal region, bearing a thick and flattened sagittal crest. The brain-case is low, short, and narrow, and placed at a considerably higher level than the elongate facial portion. Both the cranial and facial portion are somewhat bent upwards, the former posteriorly, the latter anteriorly. A striking general character is the remarkable *pachyostosis* (thickening) of the cranium.

The author points out that, in its peculiar features, this skull only carries to an extreme characters which are present, but in a much lesser degree, and in varying gradations, in the different members of the *Lemuroidea*, both recent *Lemuridæ*, and extinct *Adapidæ*. In the very simple pattern of the molars, the superior of which are of the pure tritubercular type, *Megaladapis* approaches closely to the Malagasy Lemurids *Lepidolemur* and still more to *Chirogaleus*.

The diminutive size of the brain-case (comparable only with what we find amongst the Marsupialia and the Insectivora) is viewed by the author, in this instance, as a degeneracy, other characters being equally indicative of a retrogressive evolution undergone by this Lemuroid.

It is strongly insisted upon, generally, that "low" organisation in Mammalia is by no means always synonymous with "primitive" organisation, and that retrogressive evolution is more frequently to be met with amongst Mammalia than is generally admitted.

As regards the geological age of *Megaladapis* and its associated fauna, one of whose members, the *Crocodilus robustus*, is still living in the lakes of the interior, evidence of various kinds goes far to prove that these sub-fossil remains represent a fauna which was living at a comparatively very recent period, and that man himself was also contemporary with it, and in part responsible for its destruction.

The author adduced evidence in support of the proposition that an older Tertiary vertebrate fauna will ere long be forthcoming in Madagascar.

"On Operators in Physical Mathematics. Part II." By Oliver Heaviside, F.R.S.

It is first shown how the ascending and descending series for the first cylinder function may be algebraically harmonised. If A is the ordinary ascending series in even powers, B the equivalent series in odd powers, and C the equivalent descending series which is most useful for numerical calculation, then $C = \frac{1}{2}(A+B)$. This contains the explanation of a former anomaly. A and C were known to the author to be equivalent as operators, also algebraically and numerically equivalent with positive argument. But when the argument is a pure imaginary A remains real, whilst C becomes complex. A becomes the original oscillating first cylinder function. C contains it and the second oscillating function as well. But the identity $C = \frac{1}{2}(A+B)$ explains it. Both sides remain identical when the argument is imaginary. The second oscillating function is brought in by B.

The generalised formula of which C is an extreme case is then investigated.

The extreme forms of the binomial theorem are then examined. It is shown that when the index is a negative integer the generalised formula becomes indeterminate, consisting of the two extreme forms combined in any ratio.

A more general operator and the equivalences to which it leads are then examined. There is sometimes satisfactory equivalence for numerical purposes by employing only the initial convergent portion of the divergent series, but this fails when the index of the operator is in the neighbourhood of a negative integer.

The general question of the meaning of equivalent and of divergent series is then discussed. The difference stated by Boole to exist between divergent series of the alternating and of the continuous type, in that the former may, whilst the latter cannot, be employed for calculation, appears to be groundless. They are alike in the respect alluded to. But the true meaning of numerical equivalence is unsettled, for there are many cases in which formulæ believed to be analytically and algebraically equivalent show no visible numerical equivalence.

Some generalised formulæ involving the logarithm are then discussed, and some independent verifications found. A formula for Euler's constant is obtained and examined.

One of these formulæ brings in the second cylinder function, which is discussed by means of an operator leading to it; also its connexion with the first solution, and of both with the corresponding two oscillating functions. Various analogies are pointed out, especially through an operator containing two differentiators, leading to elastic wave solutions. Some applications and extensions will follow in Part III.

"On a Failure of the Law in Photography that when the Products of the Intensity of the Light acting and of the Time of Exposure are Equal, Equal Amounts of Chemical Action will be produced." By Capt. W. de W. Abney, C.B., F.R.S.

The above law has been generally assumed. In some recen experiments, however, I have discovered that this law breaks down under certain conditions. Quite lately I have described the method of comparing the photographic value of sunlight with that of candle light (*Photographic Journal*, June, 1893), which was as follows:—A beam light would be admitted through a narrow slit to sensitive bromide paper stretched round a drum of about 4 inches in diameter. The drum could be caused to rotate round its axis at any speed up to about sixty revolutions per second, by means of an electromotor. Part of the experiment was to place an amyl acetate lamp in position at any convenient distance from the slit exposure being given for a fixed time during rotation. The slit was next replaced by a small square aperture, of some ½ inch side, and other portions of the same paper were exposed to the amyl acetate light at the same distance, for varying but known exposures, with the drum at rest. On development the paper showed, amongst other things, a narrow band of deposit of the width of the slit caused by the light from the amyl acetate lamp, and a row of squares of varying blackness of deposit due to the different exposures given with the drum at rest.

By comparing the blackness of the band with the scale of blackness, the width of the slit would evidently be calculated, supposing the usually accepted law to hold good under all circumstances. On making such calculations in every case the calculated width of the slit was always considerably less than what it was in reality, the difference being far beyond that which would be caused by any error in the measurement. This led to an investigation into the cause of this difference.

The following experiment was made. The circumference of the drum with the paper stretched round it was 12·25 in. The width of the slit was arranged to be 0·012 in. The amyl acetate lamp was placed 2 feet from the slit, and a rotation of 30 per sec. was given to the drum for one exposure, and 1 per sec. for a second exposure. In the first case the time of exposure during each revolution was $\frac{0{\cdot}012}{12{\cdot}25} \times \frac{1}{30}$ sec., or about 1/30,000 sec.

The sum of the exposures during 20 min. was thus 1·176 sec. In the other case the exposure was

$$\frac{0{\cdot}012}{12{\cdot}25}, \text{ or about } 1/1000 \text{ sec.,}$$

and the sum of the exposures was, as before, 1·176 sec. Thus the first individual exposures had only $\frac{1}{30}$ of the duration of the second exposures, though in the aggregate they were the same.

A scale of blackness was made on the same paper, through a square aperture, without shifting the lamp, the exposures being ⅛, ¼, ½, 1, 2, 4, and 8 sec. The scale and blackness of the bands were measured accurately, and the times of exposure which had been given to each band, on the assumption that the law enunciated held good, was calculated and found to be for the first band 0·6 sec., and for the second band 0·91 sec., instead of 1·176 sec. which was really given in all. Another example is where the slit was opened to 0·11 in., and the time of exposure reduced from 20 to 10 min. It was found that in this case the exposures given on the same assumption were 3·7 sec. and 5·28 sec., the real exposure given being 5·36. Other experiments are quoted.

It is to be remarked that the more sensitive a surface is to radiation the less marked are the differences observable for the same speeds of rotation. This is what might be expected.

As an outcome of the experiments so far made, it seems that when exposures less than 1/1000 sec. are made, and the source of illumination is an amyl acetate lamp (Von Altneck's) placed 1 foot from the sensitive surface, the law fails.

The question of very low intensities of light acting, and of the sensitiveness to different spectrum colours, is now under consideration.

[*Note by the author*. It may be stated that it has subsequently been proved that the law equally fails where feeble intensities of light act on the sensitive surface.]

Geological Society, June 21.—Dr. H. Woodward, F.R.S., Vice-President, in the chair.—The following communications were read:—On composite dykes in Arran, by Prof. J. W.

Judd, F.R.S. The author proposed to apply the term "composite dyke" to any fissure which contains two or more distinct varieties of igneous rock, differing from one another in chemical composition or mineralogical constitution. Such dykes fall into two classes:—(1) Dykes in which differentiation has evidently taken place in the materials after their injection, as in the examples described by Dr. Lawson in Canada and by Prof. Vogt in Norway. (2) Dykes in which there is evidence of the reopening of the fissure after its first injection and the introduction of materials of totally different composition. It is this class of dykes of which such interesting illustrations are found in Arran. These Arran dykes belong to the latest volcanic eruptions of the British Islands; their analogues are found alike in the south of Scotland, and in the north of England and of Ireland. They are the infilled fissures along which sporadic volcanic outbursts took place after the extinction of the great volcanoes of the Inner Hebrides. The subaerial products of these later, and, for the most part, insignificant volcanic eruptions, have been all swept away by denudation, except at Beinn Hiant and the Sgúr of Eigg. The materials filling these dykes belong to two totally different classes—one distinctly basic, with about 55 per cent. of silica; and the other markedly acid in composition, with from 65 to 75 per cent. of silica. The basic rock is an augite-andesite, which passes sometimes into an intersertal and occasionally into an ophitic dolerite (tholeite and diabase); the glass of this rock shows a great tendency to separate from the phenocrysts. The acid rock is often a highly vitreous material ("pitchstone" or "pitchstone-porphyry") which by devitrification passes into various forms of felsite and quartz-felsite. These rocks, if we class them according to the nature of the porphyritic minerals they contain, fall into the several groups of vitrophyric and trachytoid lavas, to which the terms pantellerite, quartz-pantellerite, rhyolite, andesite, and dacite have been applied. The glassy groundmass in the whole of these rocks, however, is always abundant and its characters are remarkably uniform however much the phenocrysts may vary. The author pointed out that, while the peculiarities of the first class of composite dykes can be accounted for by selective crystallisation and liquation going on within the magma which has been injected into the dyke, no such explanation is sufficient in the case of the composite dykes of the second class. That the association of two totally different rocks in the same dyke is not accidental, the numerous and varied examples at Tormore sufficiently prove. Where, as in these cases, it is found that there is the greatest dissimilarity between both the crystals and the glassy groundmass of the two rocks, the differentiation has taken place in the magma, prior to its injection into the dykes, and before the work of crystallisation had commenced. Prof. Bonney, Mr. W. W. Watts, Mr. Hulke, and Mr. Teall took part in the discussion on the paper, and the author briefly replied.—Notes on an intrusive sheet of diabase and associated rocks at Robin Hood, near Bassenthwaite, by J. Postlethwaite. The positions of the outcrops of the igneous rock were described, and a grit-band was recorded as running parallel to the diabase. The diabase, and vein-stuff associated with it, have furnished antimony, lead, copper, and arsenic; and the same ores, with the exception of the last two, were also found in minute grains in the grit. Analyses of the grit and diabase have been made by Messrs. Hellon and Brockbank. Prof. Bonney has examined slides submitted by the author, and allowed his notes to be used in the paper. The igneous rock has produced slight metamorphism in the surrounding rocks of the Skiddaw Slates.—On two dinosaurian teeth from Aylesbury, by R. Lydekker. Two teeth from the neighbourhood of Aylesbury, believed to be of Portlandian age, were referred to the sames species as a tooth figured by De La Moussay from the Portlandian of Boulogne. The Aylesbury teeth were described, and the nature of the animal which possessed them was discussed.—On a new plesiosaur from the Waipara River, New Zealand, by Capt. F. W. Hutton, F.R.S. This specimen was shortly described by Sir James Hector in 1873. The author considered it more prudent to follow Mr. Lydekker in referring all the known New Zealand Cretaceous Sauropterygians to Leidy's genus *Cimoliosaurus*, and he therefore described this form as a new species of that genus.—Observations on the affinities of the genus *Astrocœnia*, by Robert F. Tomes. Researches recently made by the author relative to the structure of certain undoubted *Astrocœniæ* of the Gosau beds, having for their primary object the better understanding of the supposed species of the genus obtained from the Glamorganshire conglomerate, have been productive of results which will render a complete modification in the classificatory position of the genus imperative. The author gave a new definition of the genus, in which he did not include any species of an earlier date than the cretaceous period, all the so-called Jurassic *Astrocœniæ* being referable to other and quite distinct genera.—Description of a new genus of *Madreporaria* from the Sutton Stone of South Wales, by Robert F. Tomes. In the *Quarterly Journal* for 1885 is a detailed description of a coral from the Sutton Stone named *Astrocœnia gibbosa*. This specimen is not the type of the species, and a re-examination of it by the author has proved that it is not an *Astrocœnia*. Two other specimens have also been examined, and as a result of examination of the three the author is enabled to found a new genus *Styloseris*, of which a diagnosis was given, and the specific name *gibbosa* was retained for this, the only known species. The genus will take its place near *Clausastræa*, from which it differs by possessing a well-developed columella and increasing by both fissiparity and gemmation. Mr. Etheridge and Dr. G. J. Hinde took part in the discussion that followed.—Study of the dykes of Hope, Idaho, by Herbert R. Wood. A description was given of the geographical distribution and characters of acid and basic dykes traversing slates and quartzites along the northern shore of Lake Pend'Oreille, Idaho, accompanied by notes on the glaciation of the area. The microscopic features of the igneous rocks were also described.—The rise and fall of Lake Tanganyika, by Dr. Robert Sieger. The author referred to Mr. Carson's paper on the same subject in the Society's Journal for 1892. He himself believed the oscillation of level to be analogous to variations reported as occurring in other African lakes, and to be due to climatic change. He brought forward evidence in favour of the coincidence of change of level and climatic change, but did not believe that his views are by any means contradictory to those of Mr. Carson, for the phenomena may be explained by a combination of the influences of climate with those of mechanical agencies.—On Cheilostomatous Bryozoa from the Middle Lias, by Edwin A. Walford. The author described some forms of bryozoa from the *spinatus*-zone of the Middle Lias near Banbury, some of which had previously been classed with the Cyclostomata. The new material not only shows the opercular aperture but the opercula *in situ*, together with appendages and supra-oral ovicells characteristic of the Cheilostomata. In addition he also found giant cells (cistern-cells) of form quite dissimilar from the ordinary zoœcia and probably reproductive. He cited M. Jules Haime as having described in his magnificent monograph somewhat similar cells from the Inferior Oolite; and in the Oxfordshire Great Oolite bryozoa Mr. Walford found cistern-cells like the Lias species on some colonies like *Diastoporæ*. He contended that it is merely the acquisition of very well-preserved material which is needed to show the necessity of removal of many such species to the Cheilostomata. The name *Cisternophora* was suggested for the genus, of which several forms were described.

Royal Microscopical Society, June 21.—The Rev. Canon Carr in the chair.—Dr. J. E. Talmage, of Salt Lake City, Utah, exhibited and gave an account of some specimens of selenite found in the interior of a mound at South Wash, near Fremont River, Utah. As a rule, portions of selenite useful for optical purposes are measured by inches and weighed by ounces, but here he had found some which weighed 1000 lbs. The formation around the mound was mostly sand and clay, and the region bore everywhere strong evidences of weathering, by means of which the mound had been weathered out into relief. He had removed some twenty tons of the crystals, amongst which were many single crystals, measuring 4 to 5 feet in length, and entirely perfect, the most regular being 4 feet long with faces of 6 inches. One fine crystal, 5 feet long, had no less than nineteen small ones jutting out from it; twins and groups were also very common. Inclusions of sand, clay, and liquid were often present. He believed this to be a unique formation.—Mr. G. C. Karop read a letter on the subject of diseased beard-hairs.—Prof. T. Jeffrey Bell read a letter from Capt. Montgomery on the subject of chicken-lice, ticks from grass, and other parasites found in Natal.—Dr. Nias read a paper on the development of the Continental form of microscope.—A discussion ensued, in which Dr. Dallinger, Dr. Braidwood, Mr. Karop, Mr. Teasdale, and the author took part.—Mr. C. Rousselet gave a *résumé* of his paper on *Floscularia pelagica* and other new rotifers.

Edinburgh.

Royal Society, June 19.—The Hon. Lord Maclaren, vice-president, in the chair.—Dr. H. R. Mill communicated a paper on the physical geography of the Clyde sea area. He considered specially the question of the distribution of temperature, discussing the observations made by the Scottish Marine Station staff on the West Coast of Scotland for March 1886 to October 1888, along with some other earlier and later observations made by Mr. J. Y. Buchanan and the Fishery Board for Scotland. In the North Channel, between Scotland and Ireland, the temperature was uniform from the surface to the bottom because of the action of the tides in mixing the water. The yearly average of the temperature of the Channel water was 2 degrees higher than that of the air of the Mull of Cantyre. The air temperature reached its maximum in the end of July, while the water temperature was greatest in the middle of September. The temperature varied greatly from surface to bottom on the broad shallow which stretches from Cantyre to Galloway, except at the time of the annual minimum, when it became uniform. The Channel water mixes there with the water from the great Arran basin. In that basin the temperature is the same from the surface to the bottom at the spring minimum in March, the lower layers being only slightly affected during the year—most so at the autumn maximum. The surface layers heat and cool rapidly; but the average temperature of the whole is always lower than that of the Channel, except for a month at the spring minimum. The maximum temperature in the basin occurs in October. In the more isolated sea lochs, such as Loch Fyne and Loch Goil, the absence of oceanic influence is more marked. Thus in Loch Fyne, though the temperature is nearly the same as at other places at the minimum period, it is colder during the rest of the year, and the difference between the surface and bottom temperatures is more marked.

July 3.—The Hon. Lord Maclaren, vice-president, in the chair.—Prof. J. Gibson read a paper on the chemical composition of sea-water.—Dr. Alex. Buchan described a diagram exhibiting the hourly variations of rainfall at Ben Nevis Observatory. The diurnal variations at Ben Nevis Observatory are much more marked than those at any other station on the globe from which Dr. Buchan had been able to get observations.—Prof. Tait gave a further discussion of the path of a rotating spherical projectile.—Dr. Noel Paton communicated a paper by Dr. Chasseaud on an experimental study of intra-ocular therapeutics.

Dublin.

Royal Dublin Society, June 21.—Prof. G. A. J. Cole in the chair.—The following papers were read:—Note on a graphitic schist from County Donegal, by Mr. R. J. Moss. The schist yielded on analysis a little over three per cent. of carbon.—On some Pycnogonida from the Irish coasts, by Mr. G. H. Carpenter. Eight species are enumerated, including two forms of *Phoxichilus*; and the various species are considered by the author to be so nearly related as to indicate that they are as yet but in process of differentiation.—A paper was communicated by Prof. A. C. Haddon on the post-embryonic development of fungia, by Captain Gilbert C. Bourne.

New South Wales.

Linnean Society, May 31.—Prof. David, President, in the chair.—The following papers were read:—Descriptions of new Australian Lepidoptera, with additional localities for known species, by T. P. Lucas.—Australian plants illustrated. No. v. *Angophora subvelutina*, F.v.M., by R. T. Baker.—The Silurian Trilobites of New South Wales. Part 2. The Genera *Prœtus* and *Cyphaspis*, by R. Etheridge, Jun., and John Mitchell.—Description of a new *Murex* from South Australia, by John Brazier.—Mr. Brazier exhibited a specimen of the South Australian *Murex polypleurus*, n.sp., described in his paper, a species which in the past, by the late Mr. G. F. Angas and other authors, has been confused with *M. pumilus*, A. Ad., from the China Sea, and Darros Island, Amirantes. Also a fossil specimen of *M. octogonus*, Q. and G., from New Zealand.—Rev. J. Milne Curran read a note recording the presence of a fossil Buprestid beetle in an earthy limonite at Inverell, N.S.W. The insect is represented by a portion of a metallic green elytron, and it is associated with Miocene fossil leaves and a species of *Unio*. He also showed a specimen of a Silurian fossil coral (*Heliolites*) from Molong, N.S.W., in a beautiful state of preservation.—Mr. Baker exhibited drawings and specimens in illustration of his paper.—Mr. Trebeck showed a specimen of a large freshwater prawn (*Palæmon ornatus*, Oliv.) from the Rewa River, Fiji.—Mr. C. T. Musson sent for exhibition specimens of a European slug, *Arion hortensis*, Müll., from New Zealand, where it is now not uncommon, though not yet recorded from Australia. Also, from the Kurrajong, N.S.W., specimens of the peculiar slug *Cystopelta petterdi*, Tate.

Paris.

Academy of Sciences, July 10.—M. Lœwy in the chair.—Note on the history of the facts which have proved the existence of the coronal atmosphere of the sun, by M. J. Janssen.—Natural introduction of terms proportional to ether displacements (Briot's terms) in equations of motion of light waves, by M. J. Boussinesq.—On the relation which exists between the co-efficients of the formulæ of Coulomb (the magnetic formula), of Laplace and of Ampère, by M. E. H. Amagat.—On a differential equation of the second order, by M. Mittag-Leffler.—Proper vibrations of a medium indefinitely extended outside a solid body, by M. Marcel Brillouin. Investigating the infinitely small proper motions of an infinite gaseous atmosphere external to a sphere which is deformed in any manner and then rendered motionless, M. Brillouin arrives at an equation which defines the pitch and quality of the sound emitted by the sphere, and also plays an important part in the motion of solids influids. Thus the form and dimensions of the bullet define the pitch and the damping of the sounds produced; the form of the vessel defines the periods of the different waves which it produces whatever may be its (small) velocity, the longest waves playing an important part in the resistance experienced. Thus, also, the presence of a rigid obstacle in a solid elastic medium determines the periods proper to the external medium, characterising the form and the properties of the body. There is every reason to believe that the waves emitted by metallic vapours correspond for the greater part to vibrations peculiar to the external ether, as will be shown in a detailed study of optical theories about to appear in the *Annales de Chimie et de Physique*.—On the realisation of constant temperatures, by M. Gouy. A criticism of M. Berget's work to determine the constant of gravitation, on the ground of the enormous difference produced in the gravimeter by a small difference of temperature.—On the electric transference of heat in electrolytes, by M. Henri Bagard. Two cylindrical glass tubes are fixed vertically in the corks of two vessels into which a current is conveyed so as to pass into the first vessel, up through the first tube into a reservoir containing a solution of some salt like zinc sulphate, down through the other tube and out by the other vessel. The lower portion of the tubes is kept at a lower, the upper at a higher temperature. A distinct Thomson effect was observed on sending a current from twelve small Daniell's through the arrangement, heat being conveyed in the direction of the current, as was easily shown by the variation of resistance, which in liquids decreases rapidly at higher temperatures.—On pyrosulphochromic hydrate, by M. A. Recoura.—On the combinations of selenious acid with molybdates, and on molybdoselenious acid, by M. E. Péchard.—On the iodosulphides of arsenic and antimony, by M. L. Ouvrard.—On the dissociation of calcium plumbate, by M. H. le Chatelier. In Kassner's process for the manufacture of oxygen, the following reaction is utilised:

$$PbO_2.2CaO = PbO + 2CaO + O.$$

Experiments were made with a view of determining the advantages or otherwise of this process as compared with barium peroxide. It was found that the disadvantage of the new method lay in the fact that it required a temperature of 900° instead of 700° for the oxygen to be dissociated at a pressure of 0·1 atmosphere. On the other hand, the plumbate, being easily fusible, absorbs oxygen more rapidly and completely, and the air need not be previously desiccated and decarbonated.—On benzoylcinchonine, by M. É. Léger. Action of sulphuric acid upon pyrocatechine and upon homopyrocatechine, by M. H. Cousin.—On a process of directly combining ethylenic and aromatic carbon compounds, by M. A. Brochet.—Attempt at the diagnosis of isomeric amido-benzoic acids and some other aromatic compounds, by M. Œchsner de Coninck.—On geraniol, by M. Ph. Barbier.—Influence of the acidity of musts upon the composition of the phlegms, by M. L. Lindet.—Greater assimilability of the nitrogen from recently formed nitrates, by M. P. Pichard.—On the composition of lime-tree "honey," by M. Maquenne.—On a new terrestrial Gregarina of the melolonthid larvæ of Provence, by M. Louis Léger.—On the *rôle* of the reserved secondary tissues of arborescent monocotyledons, by M. H. Jacob de Cordemoy.

BERLIN.

Physiological Society, May 19.—Prof. du Bois Reymond, President, in the chair.—Dr. Benda, in continuation of his remarks at the last meeting, spoke on certain questions connected with cell-division, dealing first with the value of double-staining. He then made a communication on the extra nuclear origin of the nuclear spindle and its relation to the centrosoma, and lastly on the median cell discovered by Flemming, which appears after the equatorial transverse division has become formed in the dividing cell.—Prof. Gad gave an account of experiments made by Dr. Rosenburg on the transplanting of slips of small intestine into the bladder. The experiment was successful; the functions of the bladder remained normal, and investigation showed that the muscular coat of the intestine had grown into that of the bladder, while the mucous membrane had grown up through the flattened epithelium of the organ.

June 9.—Prof. du Bois Reymond, President, in the chair.—Dr. Loewy had gone carefully into the methods of blood-titration, and concluded that the most convenient and certain way of determining the alkalinity of blood is to dilute it with a solution of magnesium sulphate and to add acid until a drop of the mixture just reddens litmus. In connection with this Prof. Zuntz gave an account of some experiments of his own and of Prof. Lehmann on the nature and compounds of the acids and bases of blood. He drew special attention to the results of passing carbon dioxide through blood whereby the alkalis leave the corpuscles and pass into the plasma as the result of a splitting up of their compounds with proteids and their conversion into diffusible carbonates.—W. Townsend Porter communicated the results of his experiments on the coordinating centres of the cardiac ventricle. Starting from the fact that the function of the centres is suppressed when the blood-supply is cut off, he had ligatured the coronary artery, supplying the septum, in a number of animals. In all cases the animals lived for many hours and even days after the operation, from which fact he considered he had disproved the existence of any coordinating centre in the septum.

Physical Society, June 2.—Prof. von Helmholtz, President, in the chair.—Dr. Rubens gave an account of experiments he had made, together with Dr. du Bois, on the permeability of metallic wire gratings to polarised heat rays. As is well known, Hertz's experiments on electric oscillations brought them into close relationship to the properties of light-vibrations, as shown by reflection, refraction, and polarisation. The fact that metallic gratings act as polarisers towards electric waves, inasmuch as the waves can only pass through when the wires of the grating are parallel to them, has no analogue in the case of light, since linearly polarised light can pass through a grating whatever be its position. On the assumption that this difference is dependent simply on the fact that light waves are too small for the gratings employed, the authors had experimented with the longer heat-rays and gratings of extremely narrow aperture. The latter were made of the finest wire (gold, silver, copper, and iron), the intervals between the wires being ·0025 mm., and the rays of a zirconium flame, up to W.L. 6μ were examined. The ocular of the spectroscope carried a very sensitive bolometer. It was found that with each of the gratings the ultra-red rays behaved like electric waves; those rays which vibrated at right angles to the plane of polarisation passed through a grating placed parallel to their plane, in threefold extent, as compared to the amount which passed when the grating was at right angles. This result was obtained with different metals with varying wave-lengths of the rays, *e.g.* with silver by W.L. above 2μ.—Dr. Krigar-Menzel reported on the present state of the experiments he is making together with Dr. Richarz on the diminution of weight at increasing altitudes. A balance is provided at each arm with two pans, one above the other at a distance apart of 2·2 m. With this balance two weights are determined, of which one lies in the upper pan, the other in the lower. The weighings are then repeated on both sides, and thus the difference of the weights when in the upper and lower pans is ascertained. In the next place a massive leaden block is built up between the two pans and the weighings are repeated. Up to the present time the weighings without the lead mass are alone complete. The block is, however, in position, and a few preliminary weighings have been made, from which it so far appears as if the presence of the lead had done away with the difference of the weights when in the upper and lower pans.

[NOTE.—In the report of the Physical Society, NATURE, vol. xlviii. p. 144, column 2, five lines from the top—"the vapours of these metals similarly gave an emission-spectrum following on the absorption spectrum"—for "similarly" read "neither," and for "following on" read "nor."]

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Heat: M. R. Wright (Longmans).—Aids in Practical Geology, 2nd edition; Prof. G. and J. Cole (Griffin).—An Introduction to the Study of the Diatomaceæ: F. W. Mills (Iliffe).—Diagnostik der Bakterien des Wassers: Dr. A. Lustig (Jena, Fischer).—Euclid's Elements of Geometry, Books v. and vi.: H. M. Taylor (Cambridge University Press).—Acoustics, Sound (Advanced), enlarged edition: W. Lees (Collins).—A Study of the Languages of Torres Straits, Part 1: S. H. Ray and A. C. Haddon (Dublin).—The Arctic Problem: A. Heilprin (Philadelphia, Contemporary Publishing Company)—Exploration of Mount Kina Balu, North Borneo: J. Whitehead (Gurney and Jackson).

PAMPHLETS.—Ueber die Typen der Küstenformen: Dr. A. Philippson.—Sir F. Ronalds, F.R.S., and his Work in Connection with Electric Telegraphy in 1816 (Simpkin).

SERIALS.—Medical Magazine, July (Southwood).—The Lingualumina, Parts 1 and 2: F. W. Dyer (London)—Proceedings of the Society for Psychological Research, June (K. Paul)—The Book of the Fair, Part 1: H. H. Bancroft (Chicago, Bancroft).—Botanische Jahrbücher für Systematik Pflanzengeschichte und Pflanzengeographie, Sechzehnter Band, iv. u. v. Heft (Williams and Norgate).—Annals of Scottish Natural History, July (Edinburgh, Douglas).—Notes from the Leyden Museum, July (Leyden, Brill.)

CONTENTS.

PAGE
Vertebrate Embryology. By Prof. E. Ray Lankester, F.R.S. 265
Rural Hygiene 266

Our Book Shelf:—

Dubois: "Die Klimate der Geologischen, Vergangenheit und ihre Beziehung zur Entwickelungsgeschichte der Sonne" 266
Foussereau: "Polarization Rotatoire, Réflexion et Réfraction virtreuses, Réflexion métallique" . . . 266

Letters to the Editor:—

The Non-Inheritance of Acquired Characters.—**Dr. Alfred R. Wallace, F.R.S.** 267
The Conditions Determinative of Chemical Change: some Comments on Prof. Armstrong's Remarks.—**Prof. W. Ramsay, F.R.S.; James Walker** . 267
The Corona Spectrum.—**J. Evershed** 268
Lord Coleridge and Vivisection.—**Prof. Percy F. Frankland, F.R.S.** 268
Oyster-Culture and Temperature.—**Prof. W. A. Herdman, F.R.S.** 269
The Diffusion Photometer.—**Prof. J. Joly, F.R.S.** . 269
Alphonse de Candolle. By W. T. Thiselton-Dyer, C.M.G., F.R.S. 269
Carl Semper. By Dr. J. Beard 271
Notes 272

Our Astronomical Column:—

Ephemeris of the New Comet 276
Comet Finlay (1886 VII.) 276
Observations of the Planet Victoria 276
Difference of Longitude between Vienna and Greenwich 277
Photographs of the Milky Way 277
The Institution of Naval Architects 277
Society of Chemical Industry 279
The Plague of Field Voles 282
The Zoological Society 283
University and Educational Intelligence 284
Scientific Serials 284
Societies and Academies 284
Books, Pamphlets, and Serials Received 288